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## Claims

1. A complex comprising a magnesium dihalide and an electron donor, characterized in that it is a complex of the magnesium dihalide and the electron donor and has the following formula (I) expressing the molar ratio between the magnesium dihalide and the electron donor:



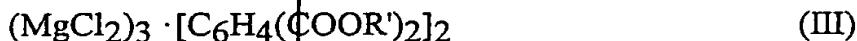
wherein  $\text{MgX}_2$  is the magnesium dihalide and  $\text{R}(\text{OR}')_n$  is the electron donor, X is a halogen, R is an n-valent  $\text{C}_1\text{-C}_{20}$  aliphatic group, an n-valent  $\text{C}_7\text{-C}_{27}$  araliphatic group or an n-valent  $\text{C}_2\text{-C}_{22}$  acyclic group, R' is a  $\text{C}_1\text{-C}_{20}$  alkyl group or a  $\text{C}_7\text{-C}_{27}$  aralkyl group, n is a number from 1 to 6 and m is defined as a number  $0.5 \leq m \leq 2.0$ .

2. The complex according to Claim 1, characterized in that X is selected from Cl, Br and I, and is preferably Cl.
3. The complex according to Claim 1 or 2, characterized in that R is an n-valent  $\text{C}_2\text{-C}_{22}$  acyclic group, preferably an n-valent aromatic  $\text{C}_7\text{-C}_{22}$  acyclic group, most preferably phthaloyl.
4. The complex according to Claim 1, 2 or 3, characterized in that R' is a  $\text{C}_6\text{-C}_{16}$  alkyl group, preferably a  $\text{C}_6\text{-C}_{12}$  alkyl group like undecyl or 2-ethyl-1-hexyl.
5. The complex according to ~~any preceding claim~~ <sup>claim 1</sup>, characterized in that n is 1 to 4, preferably about 2.0.
6. The complex according to ~~any preceding claim~~ <sup>claim 1</sup>, characterized in that m is 0.67 to 1.0.
7. The complex according to ~~any preceding claim~~ <sup>claim 1</sup>, characterized in that it is a magnesium dichloride phthalic acid ester complex having the formula (II):



wherein R' is the same as above.

8. The complex according to ~~one of Claims 1 to 5~~ <sup>claim 1</sup>, characterized in that it is a magnesium dichloride phthalic acid ester complex having the formula (III):



wherein R' is the same as above.

9. The complex according to ~~any preceding claim~~ <sup>claim 1</sup>, characterized in that it has an X-ray diffraction pattern showing a dominant peak at  $4.5^{\circ}2\theta$ .

10. Process for the preparation of a complex according to ~~any preceding claim~~ <sup>claim 1</sup> comprising a magnesium dihalide and an electron donor, characterized by reacting a magnesium compound (a) containing an alkoxy moiety, which magnesium compound is selected from the group consisting of a complex of a magnesium dihalide and a magnesium dialkoxide, a complex of a magnesium dihalide and an alcohol, and a non-complex magnesium dialkoxide, with a halogen compound (b), which is capable of forming the electron donor by replacement of its halogen by said alkoxy moiety.

11. Process according to Claim 10, characterized in that said halogen compound (b) has the formula (IV):



wherein R is an n-valent  $C_1$ - $C_{20}$  aliphatic group, an n-valent  $C_7$ - $C_{27}$  araliphatic group or an n-valent  $C_2$ - $C_{22}$  acyclic group, X is a halogen and n is 1 to 6.

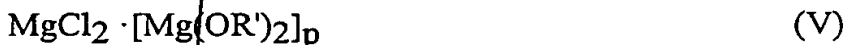
12. The complex according to Claim 11, characterized in that R is an n-valent  $C_2$ - $C_{22}$  acyclic group, preferably an n-valent aromatic  $C_7$ - $C_{22}$  acyclic group, most preferably phthaloyl.

13. Process according to Claim 11 or 12, characterized in that X is selected from Cl, Br and I, and is preferably Cl.

14. Process according to Claim 11, 12 or 13, characterized in that n is 1 to 4, preferably about 2.

15. Process according to ~~any of Claims 11 to 14~~ <sup>claim 11</sup>, characterized in that said halogen compound is an organic acid halide, preferably phthalic acid dichloride  $Ph(COCl)_2$ , wherein Ph is o-phenylene.

16. Process according to ~~any of Claims 10 to 15~~ <sup>claim 10</sup>, characterized in that said complex of a magnesium dihalide and a magnesium dialkoxide is a magnesium dichloride-magnesium dialkoxide complex of the formula (V):



wherein R' is a C<sub>1</sub>-C<sub>20</sub> alkyl group or a C<sub>7</sub>-C<sub>27</sub> aralkyl group, preferably a C<sub>6</sub>-C<sub>16</sub> alkyl group, and p is 1 to 6, preferably about 2.

17. Process according to Claim 16, characterized in that said complex of a magnesium dihalide and a magnesium dialkoxide is a magnesium dichloride-dimagnesium dialkoxide complex of the formula (VI):



wherein R' is a C<sub>1</sub>-C<sub>20</sub> alkyl group or a C<sub>7</sub>-C<sub>27</sub> aralkyl group, preferably a C<sub>6</sub>-C<sub>16</sub> alkyl group.

18. Process according to Claim 16, characterized in that said magnesium dichloride magnesium dialkoxide complex is prepared by reacting magnesium dichloride with and alcohol into an intermediate which is a magnesium dichloride alcohol complex  $\text{MgCl}_2 \cdot (\text{R}'\text{OH})_{2p}$ , wherein R' is the same as above, and reacting the magnesium dichloride alcohol complex with p mol of a magnesium dialkyl  $\text{MgR}''_2$ , wherein R'' is a hydrocarbonyl group having 1 to 20 carbon atoms.

19. Process according to Claim 18, characterized in that, independently, the molar ratio  $\text{MgCl}_2:\text{R}'\text{OH}$  is between 1:1 and 1:8, preferably between 1:2 and 1:5, the molar ratio  $\text{MgCl}_2 \cdot (\text{R}'\text{OH})_{2p}:\text{MgR}''_2$  is between 1:1 and 1:4, preferably about 1:2, the temperature is between 80 °C and 160 °C, and the reaction time is about 2 h to about 8 h.

20. Process according to Claim 15 and 17, characterized in that said magnesium compound (a) which is said magnesium dichloride-dimagnesium dialkoxide complex  $\text{MgCl}_2 \cdot [\text{Mg}(\text{OR}')_2]_2$ , wherein R' is a C<sub>6</sub>-C<sub>16</sub> alkyl group, is reacted with said halogen compound (b) which is said phthalic acid dichloride  $\text{Ph}(\text{COCl})_2$ , wherein Ph is o-phenylene.

21. Process according to any of Claims 10 to 15, characterized in that said non-complex magnesium dialkoxide has the formula (VII):



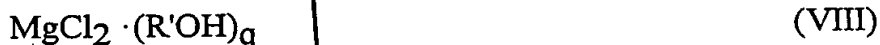
wherein R' is a C<sub>1</sub>-C<sub>20</sub> alkyl group or a C<sub>7</sub>-C<sub>27</sub> aralkyl group, preferably a C<sub>6</sub>-C<sub>16</sub> alkyl group.

22. Process according to Claim 21, characterized in that said non-complex magnesium dialkoxide is prepared by reacting a magnesium dialkyl, preferably a

magnesium dialkyl of the formula  $MgR''_2$ , wherein  $R''$  is a hydrocarbyl group having 1 to 20 carbon atoms, and an alcohol, preferably an alcohol of the formula  $R'OH$  wherein  $R'$  is the same as above.

23. Process according to Claim 15 and ~~21~~, characterized in that said magnesium compound (a) which is said non-complex magnesium dialkoxide has the formula  $Mg(OR')_2$ , wherein  $R'$  is a  $C_1$ - $C_{20}$  alkyl or a  $C_7$ - $C_{27}$  aralkyl, preferably a  $C_6$ - $C_{16}$  alkyl, is reacted with said halogen compound (b) which is said phthalic acid dichloride  $Ph(COCl)_2$ , wherein  $Ph$  is o-phenylene.

24. Process according to ~~any of Claims 10 to 15~~, <sup>claims 10</sup> characterized in that said complex of a magnesium dihalide and a magnesium dialkoxide is a complex of a magnesium dichloride and an alcohol having the formula (VIII):



wherein  $R'$  is a  $C_1$ - $C_{20}$  alkyl group or a  $C_7$ - $C_{27}$  aralkyl group, preferably a  $C_6$ - $C_{16}$  alkyl group, and  $q$  is from 1 to 6.

25. Process according to Claim 24, characterized in that said complex of a magnesium dihalide and an alcohol is prepared by reacting magnesium dichloride  $MgCl_2$  and alcohol  $R'OH$ , wherein  $R'$  is the same as above.

26. Process according to Claim 24 or ~~25~~, characterized in that the reaction temperature is kept between  $10^\circ C$  and  $100^\circ C$ , and the reaction time is about from 10 to about 90 min.

27. Process according to Claim 15 and ~~24~~, characterized in that said magnesium compound (a) which is said complex of a magnesium dihalide and an alcohol having the formula  $MgCl_2 \cdot (R'OH)_q$ , wherein  $R'$  is a  $C_1$ - $C_{20}$  alkyl or a  $C_7$ - $C_{27}$  aralkyl, preferably a  $C_6$ - $C_{16}$  alkyl, and  $q$  is from 1 to 6, is reacted with said halogen compound (b) which is said phthalic acid dichloride  $Ph(COCl)_2$ , wherein  $Ph$  is o-phenylene.

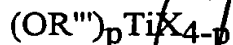
28. Process according to ~~one of Claims 10 to 27~~, <sup>claim 10</sup> characterized in that said magnesium compound (a) and said halogen compound (b) are reacted essentially stoichiometrically.

29. Use of a complex according to ~~one of Claims 1 to 9~~, <sup>claim 1</sup> or a complex prepared according to one of Claims 10 to 28 for the preparation of a polymerization catalyst component containing magnesium, transition metal, halogen and electron donor.

30. Use according to Claim 29, characterized in that said complex is reacted with a titanium halide (c).

31. Use according to Claim 30, characterized in that said titanium halide (c) has the formula (IX):

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(IX)

wherein R''' is a C<sub>1</sub>-C<sub>16</sub> alkyl group or a C<sub>7</sub>-C<sub>16</sub> aralkyl group, X is a halogen and p is 0 to 3, and preferably is a titanium tetrahalide TiX<sub>4</sub>, wherein X is the same as above, most preferably titanium tetrachloride TiCl<sub>4</sub>.

claim 1

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32. A complex according to one of claims 1 to 9, characterized in that it shows an IR spectra with a main absorption peak at 1729 cm<sup>-1</sup> for the C=O...Mg that has shifted 5 to 15 cm<sup>-1</sup>, preferably 10 cm<sup>-1</sup> to the right, and preferably also shows three shoulders.

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